

# Increasing Operating Room Throughput

## Just Buzzwords for This Decade?

IN the 1990s, Dexter *et al.*<sup>1</sup> showed clearly that one has to reduce turnover time by more than 50% of the surgical duration to be able to do one additional case. But in the first decade of this new century, three reports challenged this concept and showed that additional cases could be done.<sup>2-4</sup> These reports focused on improving operating room (OR) throughput, not by reducing the time it takes to accomplish OR turnover, but instead doing the multiple tasks of turnover simultaneously. That is, changing the nonoperative activities from a series process to a parallel process. With these initial reports, several unanswered questions still remained, including “Can these initiatives be sustained for the long-term?” and “Do you need build special facilities to accomplish the change in process?” In this month’s ANESTHESIOLOGY, Smith *et al.*<sup>5</sup> report their experience using regional anesthesia for total hip replacements and improvement in OR throughput using parallel processes. This report shows the success of their initiative over a 24-month period. Further, this success was done without a need to invest in new facilities. It seems that this concept of improving OR throughput using parallel processing may not simply be the buzzword for the decade, but a new OR management strategy that works. Or is it?

Interestingly, the concept of parallel processing may have a new name but, as our surgical colleagues will tell you, is not a new concept in the OR suite. For years, surgeons have demanded more than one OR. With two (or more) ORs running at the same time, there is no wasted or nonoperative time (the surgeon literally has no time when he or she is not performing surgery), at least from the surgeon’s perspective. This extreme form of parallel processing illustrates three fundamental principles of this concept. First, parallel processing requires an increase in personnel and sometimes additional facilities to succeed. In this example, there are two anesthesia teams and nursing/surgical technician teams as well as two ORs. Therefore, induction of the second patient can be done in the second OR while the surgeon is finishing surgery on the first patient (in the first OR). Then the nonoperative activities (emergence, transfer to

recovery room, cleanup, setup, and induction of the third patient) are all accomplished while the surgeon is performing surgery on the second patient. Second, because this process involves additional personnel, an increase in cost to perform care for the surgeon’s patients is inherent with parallel processing. The hospital, which employs the nursing/technician team, pays for the additional room, and sometimes has to provide support for the anesthesiology team, must be vested in the parallel process. Finally, the third principle is that the surgeon must also be committed to this process.

Even today, some facilities still provide two ORs for some surgeons. This management decision makes sense if the operative time (surgical time) is approximately the same or slightly longer than the nonoperative time *and* there are enough cases to support two ORs. The typical facility using the two ORs for one surgeon is an ambulatory surgical center. An example would be an orthopedic surgeon performing knee arthroscopy in 30 min. This reality is consistent with the finding of Sandberg *et al.*<sup>2</sup> that their system worked well for the short-duration surgery cases but failed in the longer surgery cases. Further, the use of two anesthesia teams is similar to the methods used by Torkki *et al.*<sup>3</sup> and Hanns *et al.*<sup>4</sup>

In contrast to the two ORs per surgeon, the use of regional anesthesia and preoperative block rooms is a way to use parallel processes while minimizing facility and some personnel costs. The current report by Smith *et al.*<sup>5</sup> illustrates the success of using regional anesthesia. Further, with regional anesthesia, the emergent period is minimal. The major challenge of this process is the need for additional anesthesiology personnel to place the block preoperatively while the previous patient’s surgery is ongoing. Another challenge to this type of process is the “time out” process. Currently, time out is done in the room after prep and drape and with the entire operating room team including the surgeon. In the case of unilateral peripheral nerve blocks, the need to do time out before placement of the block may stall the process. Although not mandated at this time, an institution may implement it if there are any cases of the wrong limb being blocked.<sup>6</sup> If this occurs, the surgeon will need to be physically available before placement of the block.

Simply changing what the anesthesia team does is not everything. In the current report, Smith *et al.* found the turnover time for total hip arthroplasty to be 15.7 min. This very short period of time with no patient in the OR can be met by the anesthesia team placing the block outside the OR. What might not be obvious is that the surgical technician setup must be done outside the OR as

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well. Hence, for complex surgeries requiring a significant instrumental setup, a sterile area outside the OR must be designated.

As described in the report by Smith *et al.*, the improvement in OR throughput involves increased costs. Hence, a cost-revenue analysis must be done to determine whether the new process makes economic sense. If the simple comparison of direct labor costs and direct revenue shows revenue is greater than costs, the decision to use this process makes sense (if there are enough cases). If the revenue is not greater than the direct costs, further analysis should be done and include benefits harder to quantify, *e.g.*, surgeon satisfaction, hospital marketing, and educational opportunities for anesthesiology residency programs.

Finally, as noted in all of the studies, a bias in patient selection is essential to the success of the high-volume process. All patients and their procedures scheduled for this process or rooms must be screened for complex medical comorbidity (for anesthesia or surgery) as well as potential complications in surgical procedures. For example, Smith *et al.* describe exclusion criteria for their process as “patients known to have severe medical comorbidity, high surgical complexity, body mass index greater than 40 kg/m<sup>2</sup>, history of spinal instrumentation or difficult previous neuroaxial anesthesia, or refusal of neuroaxial anesthesia.” In implementing a high-volume

process, the surgeon has to agree that patients who are complex or refuse regional anesthesia (for those processes using regional) are not scheduled in the high-volume rooms and are instead scheduled in regular ORs.

Improving OR throughput is not simply a buzzword of the year, but an actual possibility. But the hospital and the surgeons must be as committed to the process as the anesthesiology department. In addition, the hospital and surgeons must recognize that not all patients or surgeries are candidates for these initiatives.

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